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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1 - 3 (canceled)

Claim 4 (original): A planar waveguide device comprising a substrate defining a first microchannel and having at least two electrodes in communication with the microchannel and a first waveguide composed of a core and a cladding, wherein a first portion of the microchannel is positioned in sufficient proximity to a first portion of the core that an amount of optical power from an optical signal traversing the waveguide extends into the portion of the microchannel in proximity to the portion of the core; and wherein the microchannel contains at least a first material having optical properties, a first fluid, and a second fluid, the first fluid and the second fluid having physical properties such that the first fluid and the second fluid move said first optical material toward or away from the core when a voltage is applied to the electrodes.

Claims 5 - 6 (canceled)

Claim 7 (amended): A device according to claim 4 or claim 6 wherein the first optical material is a solid.

Claim 8 (amended): A device according to claim 4 or claim 6 wherein the first optical material is a suspension.

Claims 9 - 10 (canceled)

Claim 11(withdrawn amended): A device according to any of claims 1 and claim 4 and further comprising a second waveguide having a second core, a first portion of the second core being in sufficient proximity to the first waveguide that at least a portion of the optical power from the optical signal traversing the first waveguide couples into the second waveguide.

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Claim 12 (withdrawn): A device according to claim 11 wherein a second portion of the microchannel is in sufficient proximity to the first portion of the second core that an amount of optical power from an optical signal traversing the second waveguide extends into said second portion of the microchannel.

Claim 13 (withdrawn): A device according to claim 11 wherein the first portion of the microchannel in proximity to the first core is also in sufficient proximity to the second core that an amount of optical power from an optical signal traversing the second waveguide extends into the first portion of the microchannel.

Claim 14 (withdrawn): A device according to claim 11 wherein the device further comprises a second microchannel, a first portion of the second microchannel being in sufficient proximity to the first portion of the second core that an amount of optical power from an optical signal traversing the second waveguide extends into said first portion of the second microchannel.

Claim 15 (withdrawn): A device according to claim 14 wherein the second microchannel is a discontinuous microchannel having a first end and a second end.

Claim 16 (withdrawn): A device according to claim 15 wherein the second microchannel contains a fluid identical to one of said fluids in the first microchannel and the second microchannel has dimension about equal to dimensions of the first portion of the first microchannel such that temperature sensitivity of the device is reduced compared to an identical device that does not have the second microchannel.

Claim 17 (withdrawn): A device according to claim 14 wherein the second microchannel is a continuous microchannel.

Claim 18 (withdrawn): A device according to claim 17 wherein the second microchannel contains a first optical material and a first fluid, the first optical material being movable to and from the first portion of the second microchannel by application of electricity or heat.

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Claim 19 (withdrawn amended): A device according to any of claims 1 and claim 4 wherein the first waveguide is configured such that the optical signal is multimode as the optical signal traverses the portion of the first core positioned in sufficient proximity to the first portion of the first microchannel that said amount of optical power extends into the first portion of the first microchannel.

Claim 20 (withdrawn): A device according to claim 19 wherein the device comprises a second microchannel having a first portion in sufficient proximity to the first core that a portion of said optical power extends into the first portion of the second microchannel.

Claim 21 (withdrawn): A device according to claim 20 wherein the second microchannel is a continuous microchannel.

Claim 22 (withdrawn): A device according to claim 19 wherein the optical device is a multimode interference filter having a first exit waveguide and a second exit waveguide coupled to said first waveguide.

Claim 23 (withdrawn amended): A device according to any of claims 1 and claim 4 wherein the device is configured to separate different optical modes of the optical signal.

Claim 24 (withdrawn): A device according to claim 23 wherein said first waveguide forms a portion of a first exit waveguide from the device, wherein the device further comprises a first entrance waveguide, a second entrance waveguide, and a second exit waveguide in optical communication with a multimode interference waveguide, wherein the first entrance waveguide and the second entrance waveguide are of unequal width, wherein the first exit waveguide and the second exit waveguide are of equal width, and wherein a second portion of the first microchannel is also positioned in sufficient proximity to a portion of said second exit waveguide that an amount of said optical power extends into said second portion of the first microchannel.

Claim 25 (withdrawn): A device according to claim 24 wherein said first portion of the first microchannel is positioned adjacent to the first exit waveguide in sufficient proximity that a portion of power of the optical signal entering the first exit waveguide extends into the first portion

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of the first microchannel and said second portion of the first microchannel is positioned adjacent to the second exit waveguide in sufficient proximity that a portion of power of the optical signal entering the second exit waveguide extends into the second portion of the first microchannel.

Claim 26 (withdrawn amended): A device according to ~~any of claims 1 and claim 4~~ wherein the device is configured to effect an interference of the optical signal.

Claim 27 (withdrawn): A device according to claim 26 wherein the device comprises a Mach-Zehnder interferometer.

Claim 28 (withdrawn): A device according to claim 26 wherein the device comprises a multimode interference filter.

Claim 29 (withdrawn amended): A device according to ~~any of claims 1 and claim 4~~ wherein the device is configured to leak at least a portion of the optical signal from the core.

Claim 30 (withdrawn): A device according to claim 29 wherein said first microchannel forms a portion of the cladding and not the core of the device.

Claim 31 (original): A device according to claim 4 wherein the first microchannel is a continuous microchannel in which a fluid may circulate.

Claim 32 (original): A device according to claim 4 wherein the first microchannel is a discontinuous microchannel having a first end and a second end.

Claim 33 (original): A device according to claim 32 wherein the first fluid is a liquid and the first end of the first microchannel is in communication with a first reservoir containing a compressible gas.

Claim 34 (original): A device according to claim 33 wherein the second end of the microchannel is in communication with a second reservoir containing the compressible gas.

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Claim 35 (original): A device according to claim 34 wherein the first and second reservoirs are in fluid communication such that said compressible gas moves between the first and second reservoirs as the liquid moves in the first microchannel.

Claim 36 (withdrawn amended): A device according to ~~any of claims 1 and claim 4~~ wherein the first portion of the first microchannel supplants said portion of the core of the first waveguide.

Claim 37 (withdrawn): A device according to claim 36 wherein the first portion of the first microchannel supplants a sufficient amount of said core that said core is bisected by the first portion of the microchannel.

Claim 38 (withdrawn amended): A device according to claim 4 and 4 wherein the first portion of the first microchannel does not supplant said portion of the core of the first waveguide.

Claim 39 (withdrawn): A device according to claim 38 wherein the first portion of the first microchannel is immediately adjacent to said portion of the core of the first waveguide.

Claim 40 (withdrawn): A device according to claim 38 wherein the first portion of the first microchannel is adjacent to and separated from said portion of the core of the first waveguide by a portion of the cladding.

Claim 41 (withdrawn): A device according to claim 39 wherein said first portion of the core of the first waveguide is rib-shaped and wherein said first portion of the first microchannel is adjacent to one face of the rib.

Claim 42 (withdrawn): A device according to claim 39 wherein said first portion of the core of the first waveguide is rib-shaped and wherein said first portion of the first microchannel is adjacent to three faces of the rib.

Claim 43 (withdrawn amended): A device according to ~~any of claims 1 and claim 4~~ wherein the first portion of the microchannel has a first cross-sectional area, and a second portion of

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the microchannel away from the first waveguide has a second cross-sectional area greater than the first cross-sectional area.

Claim 44 (withdrawn amended): A device according to any of claims 1 and claim 4 wherein the first portion of the microchannel has a first cross-sectional area, and a second portion of the microchannel away from the first waveguide has a second cross-sectional area smaller than the first cross-sectional area.

Claim 45 (withdrawn): A device according to claim 43 wherein the microchannel contains a first optical material in or near the first portion of the microchannel and the microchannel contains a first fluid and a second fluid in a second portion of the microchannel, the first and second fluids having physical properties such that an interface between the first fluid and the second fluid moves as heat is applied to at least the first fluid or electricity is applied to the first and second fluids to thereby move the first optical material out of or into the first portion of the microchannel.

Claim 46 (withdrawn amended): A device according to any of claims 1 and claim 4 wherein the first portion of the microchannel has a portion of a surface defining the microchannel modified to provide a force to the first optical material when an interface between the first optical material and the first fluid encounters said portion of the surface.

Claim 47 (original): A device according to claim 4 wherein the first optical material comprises a fluid selected for one or more of its refractive, diffractive, dispersive, absorptive, and reflective properties.

Claim 48 (original): A device according to claim 4 wherein the first optical material is a solid.

Claim 49 (withdrawn amended): A device according to any of claims 1 and claim 4 wherein the device is configured as an evanescent coupler or a Mach Zehnder interferometer.

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Claim 50 (withdrawn amended): A device according to ~~any of claims 1 and claim 4~~ wherein the device is configured as an optical shutter, a switch, an attenuator, a branching waveguide switch, a reflection switch, a total internal reflection switch, or a multiplexer.

Claim 51 (withdrawn): A device according to claim 4 wherein said device contains at least two immiscible fluids.

Claim 52 (original): A method of making a planar waveguide device comprising forming an open-faced continuous microchannel in sufficient proximity to a core of a waveguide that at least a portion of optical power from an optical signal passing through the waveguide extends into the microchannel, placing at least a first and a second fluid into the microchannel such that a first interface between the first and second fluids is movable by an external force such that an amount of the first fluid in proximity to the core is displaced by the second fluid as the first interface moves, and placing a lid over the open-faced continuous microchannel and attaching the lid to the face of the substrate.

Claim 53 (original): A method according to claim 52 wherein said microchannel is formed at least partially in said lid.

Claim 54 (original): A method according to claim 52 wherein said microchannel is formed in the substrate.

Claim 55 (original): A method according to claim 52 wherein the act of placing the first and the second fluids into the microchannel is performed after attaching the lid to the face of the substrate through through-holes in said lid or in said substrate.

Claim 56 (original): A method according to claim 52 wherein said method further comprises forming electrodes at said microchannel which provide said external force.

Claim 57 (original): A method according to claim 56 wherein at least one of said electrodes is formed on said lid.

Claims 58 - 59 (canceled)

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Claim 60 (original): A method of making a planar waveguide device comprising forming a microchannel in sufficient proximity to a core of a waveguide that at least a portion of optical power from an optical signal passing through the waveguide extends into the microchannel, placing a plurality of fluids comprising at least a first and a second fluid into the microchannel such that a first interface between the first and second fluids is movable by an external force applied to a second fluid interface such that an amount of the first fluid in proximity to the core is displaced by the second fluid as the first interface moves, and providing electrodes in sufficient proximity to the second fluid interface that the interface is movable using a force selected from at least one force selected from the group consisting of differential-pressure electrocapillarity, electrophoresis, electroosmosis, dielectrophoresis, electrohydrodynamic pumping, magnetohydrodynamic pumping, dielectric pumping, and variable dielectric pumping.

Claim 61 (original): A method according to claim 52 wherein said microchannel is formed by removing at least a portion of the core of the waveguide.

Claim 62 (original): A method according to claim 52 wherein said microchannel is formed by removing said cladding to a surface of the core.

Claim 63 (original): A method according to claim 52 wherein said microchannel is formed by removing said cladding to a distance from the core leaving cladding between the microchannel and the core.

Claim 64 (original): A method according to claim 52 wherein said device is hermetically sealed.

Claim 65 (canceled)

Claim 66 (canceled)

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Claim 67 (new): An optical device comprising a substrate defining a first microchannel and having a first waveguide composed of a core and a cladding, wherein a first portion of the microchannel is positioned in sufficient proximity to a first portion of the core of the waveguide that an amount of optical power from an optical signal traversing the waveguide extends into the microchannel, wherein the microchannel contains at least a first fluid and a second fluid, and wherein the first fluid and the second fluid have physical properties such that the first fluid and the second fluid move under at least one force selected from the group consisting of differential-pressure electrocapillarity, electrophoresis, electroosmosis, dielectrophoresis, electrohydrodynamic pumping, magnetohydrodynamic pumping, dielectric pumping, and variable dielectric pumping.

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